ENVISION SAN JOSE 2040
GENERAL PLAN COMPREHENSIVE UPDATE
NOISE BACKGROUND REPORT
SAN JOSE, CALIFORNIA

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Introduction

The Noise Element of a General Plan is a comprehensive approach for including noise control in the planning process. It is a tool for achieving and maintaining environmental noise levels compatible with land use. The Noise Element identifies noise-sensitive land uses and noise sources, defines areas of noise impact, and establishes goals, policies, and programs so that residents in the City of San José will be protected from excessive noise. The Noise Element also presents information regarding sources of ground vibration such as construction activities and railroad trains.

This Existing Conditions Report provides background information concerning the methods and data utilized in the City of San José Noise Element Update. A brief discussion of noise and vibration concepts is presented to assist the reader in understanding the discussion. Existing conditions were documented through noise monitoring surveys completed by our firm for this project and others in San José since 2005. This report focuses on the predominant sources of environmental noise that affect the City, including vehicular traffic, aircraft, and railroad trains.

A. Noise and Vibration Concepts

1. Terminology

Noise may be defined as unwanted sound. Noise is usually objectionable because it is disturbing or annoying. The objectionable nature of sound could be caused by its *pitch* or its loudness. *Pitch* is the height or depth of a tone or sound, depending on the relative rapidity (frequency) of the vibrations by which it is produced. Higher pitched signals sound louder to humans than sounds with a lower pitch. *Loudness* is intensity of sound waves combined with the reception characteristics of the ear. Intensity may be compared with the height of an ocean wave in that it is a measure of the amplitude of the sound wave.

In addition to the concepts of pitch and loudness, there are several noise measurement scales which are used to describe noise in a particular location. A *decibel (dB)* is a unit of measurement which indicates the relative amplitude of a sound. The zero on the decibel scale is based on the lowest sound level that the healthy, unimpaired human ear can detect. Sound levels in decibels are calculated on a logarithmic basis. An increase of 10 decibels represents a ten-fold increase in acoustic energy, while 20 decibels is 100 times more intense, 30 decibels is 1,000 times more intense, etc. There is a relationship between the subjective noisiness or loudness of a sound and its intensity. Each 10 decibel increase in sound level is perceived as approximately a doubling of loudness over a fairly wide range of intensities. Technical terms are defined in Table 1.

There are several methods of characterizing sound. The most common in California is the *A-weighted sound level or dBA*. This scale gives greater weight to the frequencies of sound to which the human ear is most sensitive. Representative outdoor and indoor noise levels in units of dBA are shown in Table 2. Because sound levels can vary markedly over a short period of time, a method for describing either the average character of the sound or the statistical behavior of the variations must be utilized. Most commonly, environmental sounds are described in terms of an average level that has the same acoustical energy as the summation of all the time-varying events. This energy-equivalent sound/noise descriptor is called L_{eq}. The most common averaging period is hourly, but L_{eq} can describe any series of noise events of arbitrary duration.

The scientific instrument used to measure noise is the sound level meter. Sound level meters can accurately measure environmental noise levels to within about plus or minus 1 dBA. Various computer models are used to predict environmental noise levels from sources, such as roadways and airports. The accuracy of the predicted models depends upon the distance the receptor is from the noise source. Close to the noise source, the models are accurate to within about plus or minus 1 to 2 dBA.

Since the sensitivity to noise increases during the evening and at night -- because excessive noise interferes with the ability to sleep -- 24-hour descriptors have been developed that incorporate artificial noise penalties added to quiet-time noise events. The *Community Noise Equivalent Level, CNEL*, is a measure of the cumulative noise exposure in a community, with a 5 dB penalty added to evening (7:00 pm - 10:00 pm) and a 10 dB addition to nocturnal (10:00 pm - 7:00 am) noise levels. The *Day/Night Average Sound Level, DNL*, is essentially the same as CNEL, with the exception that the evening time period is dropped and all occurrences during this three-hour period are grouped into the daytime period.

2. Effects of Noise

a. Hearing Loss

While physical damage to the ear from an intense noise impulse is rare, a degradation of auditory acuity can occur even within a community noise environment. Hearing loss occurs mainly due to chronic exposure to excessive noise, but may be due to a single event such as an explosion. Natural hearing loss associated with aging may also be accelerated from chronic exposure to loud noise.

The Occupational Safety and Health Administration (OSHA) has a noise exposure standard which is set at the noise threshold where hearing loss may occur from long-term exposures. The maximum allowable level is 90 dBA averaged over eight hours. If the noise is above 90 dBA, the allowable exposure time is correspondingly shorter.

b. Sleep and Speech Interference

The thresholds for speech interference indoors are about 45 dBA if the noise is steady and above 55 dBA if the noise is fluctuating. Outdoors the thresholds are about 15 dBA higher. Steady noise of sufficient intensity (above 35 dBA) and fluctuating noise levels above about 45 dBA have been shown to affect sleep. Interior residential standards for multi-family dwellings are set by the State of California at 45 dBA DNL. Typically, the highest steady traffic noise level during the daytime is about equal to the DNL and nighttime levels are 10 dBA lower. The standard is designed for sleep and speech protection and most jurisdictions apply the same criterion for all residential uses. Typical structural attenuation is 12-17 dBA with open windows. With closed windows in good condition, the noise attenuation factor is around 20 dBA for an older structure and 25 dBA for a newer dwelling. Sleep and speech interference is therefore possible when exterior noise levels are about 57-62 dBA DNL with open windows and 65-70 dBA DNL if the windows are closed. Levels of 55-60 dBA are common along collector streets and secondary arterials, while 65-70 dBA is a typical value for a primary/major arterial. Levels of 75-80 dBA are normal noise levels at the first row of development outside a freeway right-of-way. In order to achieve an acceptable interior noise environment, bedrooms facing secondary roadways need to be able to have their windows closed; those facing major roadways and freeways typically need special glass windows with Sound Transmission Class ratings greater than 30 STC.

c. Annoyance

Attitude surveys are used for measuring the annoyance felt in a community for noises intruding into homes or affecting outdoor activity areas. In these surveys, it was determined that the causes for annoyance include interference with speech, radio and television, house vibrations, and interference with sleep and rest. The DNL as a measure of noise has been found to provide a valid correlation of noise level and the percentage of people annoyed. People have been asked to judge the annoyance caused by aircraft noise and ground transportation noise. There continues to be disagreement about the relative annoyance of these different sources. When measuring the percentage of the population highly annoyed, the threshold for ground vehicle noise is about 55 dBA DNL. At a DNL of about 60 dBA, approximately 2 percent of the population is highly annoyed. When the DNL increases to 70 dBA, the percentage of the population highly annoyed increases to about 12 percent of the population. Therefore, there is an increase in annoyance due to ground vehicle noise of about 1 percent per dBA between a DNL of 60-70 dBA. Between a DNL of 70-80 dBA, each decibel increase increases the percentage of the population highly annoyed by about 2 percent. People appear to respond more adversely to aircraft noise. When the DNL due to aircraft noise is 60 dBA, approximately 10 percent of the population is believed to be highly annoyed. Each decibel increase to 70 dBA adds about 2 percentage points to the number of people highly annoyed. Above 70 dBA, each decibel increase in aircraft noise results in about a 3 percent increase in the percentage of the population highly annoyed.

Table 1 Definitions of Acoustical Terms Used in this Report

Term	Definitions
Decibel, dB	A unit describing, the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure. The reference pressure for air is 20.
Sound Pressure Level	Sound pressure is the sound force per unit area, usually expressed in micro Pascals (or 20 micro Newtons per square meter), where 1 Pascal is the pressure resulting from a force of 1 Newton exerted over an area of 1 square meter. The sound pressure level is expressed in decibels as 20 times the logarithm to the base 10 of the ratio between the pressures exerted by the sound to a reference sound pressure (e.g., 20 micro Pascals). Sound pressure level is the quantity that is directly measured by a sound level meter.
Frequency, Hz	The number of complete pressure fluctuations per second above and below atmospheric pressure. Normal human hearing is between 20 Hz and 20,000 Hz. Infrasonic sound are below 20 Hz and Ultrasonic sounds are above 20,000 Hz.
A-Weighted Sound Level, dBA	The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise.
Equivalent Noise Level, L_{eq}	The average A-weighted noise level during the measurement period.
L_{max}, L_{min}	The maximum and minimum A-weighted noise level during the measurement period.
L_{01}, L_{10}, L_{50}, L_{90}	The A-weighted noise levels that are exceeded 1%, 10%, 50%, and 90% of the time during the measurement period.
Day/Night Noise Level, L_{dn} or DNL	The average A-weighted noise level during a 24-hour day, obtained after addition of 10 decibels to levels measured in the night between 10:00 pm and 7:00 am.
Community Noise Equivalent Level, CNEL	The average A-weighted noise level during a 24-hour day, obtained after addition of 5 decibels in the evening from 7:00 pm to 10:00 pm and after addition of 10 decibels to sound levels measured in the night between 10:00 pm and 7:00 am.
Ambient Noise Level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.
Intrusive	That noise which intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level.

Table 2 Typical Noise Levels in the Environment

Common Outdoor Noise Source	Noise Level (dBA)	Common Indoor Noise Source
	120 dBA	
Jet fly-over at 300 meters		Rock concert
	110 dBA	
Pile driver at 20 meters	100 dBA	
		Night club with live music
	90 dBA	
Large truck pass by at 15 meters		
	80 dBA	Noisy restaurant
		Garbage disposal at 1 meter
Gas lawn mower at 30 meters	70 dBA	Vacuum cleaner at 3 meters
Commercial/Urban area daytime		Normal speech at 1 meter
Suburban expressway at 90 meters	60 dBA	
Suburban daytime		Active office environment
	50 dBA	
Urban area nighttime		Quiet office environment
	40 dBA	
Suburban nighttime		
Quiet rural areas	30 dBA	Library
		Quiet bedroom at night
Wilderness area	20 dBA	
Most quiet remote areas	10 dBA	Quiet recording studio
Threshold of human hearing	0 dBA	Threshold of human hearing

3. Ground-borne Vibration

Ground vibration consists of rapidly fluctuating motions or waves with an average motion of zero. Several methods are typically used to quantify the amplitude of vibration including Peak Particle Velocity (PPV) and Root Mean Square (RMS) velocity. PPV is defined as the maximum instantaneous positive or negative peak of the vibration wave. RMS velocity is defined as the average of the squared amplitude of the signal. PPV and RMS vibration velocity amplitudes are used to evaluate human response to vibration.

Low-level vibrations frequently cause irritating secondary vibration, such as a slight rattling of windows, doors or stacked dishes. The rattling sound can give rise to exaggerated vibration complaints, even though there is very little risk of actual structural damage. In high noise environments, which are more prevalent where ground-borne vibration approaches perceptible levels, this rattling phenomenon may also be produced by loud airborne environmental noise causing induced vibration in exterior doors and windows.

In urban environments, such as San José, sources of ground-borne vibration include construction activities, light and heavy rail transit, and heavy trucks and buses.

a. Construction Vibration

Construction activities can cause vibration that varies in intensity depending on several factors. The use of pile driving and vibratory compaction equipment typically generates the highest construction related ground-borne vibration levels. Because of the impulsive nature of such activities, the use of the peak particle velocity descriptor (PPV) has been routinely used to measure and assess ground-borne vibration and almost exclusively to assess the potential of vibration to induce structural damage and the degree of annoyance for humans.

The two primary concerns with construction-induced vibration, the potential to damage a structure and the potential to interfere with the enjoyment of life are evaluated against different vibration limits. Studies have shown that the threshold of perception for average persons is in the range of 0.2 to 0.3 mm/sec (0.008 to 0.012 inches/sec), PPV. Human perception to vibration varies with the individual and is a function of physical setting and the type of vibration. Persons exposed to elevated ambient vibration levels such as people in an urban environment may tolerate a higher vibration level.

Structural damage can be classified as cosmetic only, such as minor cracking of building elements, or may threaten the integrity of the building. Safe vibration limits that can be applied to assess the potential for damaging a structure vary by researcher and there is no general consensus as to what amount of vibration may pose a threat for structural damage to the building. Construction-induced vibration that can be detrimental to a building is very rare and has only been observed in instances where the structure is at a high state of disrepair and the construction activity (e.g., impact pile driving) occurs immediately adjacent to the structure.

Table 3 displays continuous vibration impacts on human annoyance and on buildings. As discussed previously, annoyance is a subjective measure and vibrations may be found to be annoying at much lower levels than those shown, depending on the level of activity or the sensitivity of the individual. To sensitive individuals, vibrations approaching the threshold of perception can be annoying.

Table 3 Reaction of People and Damage to Buildings for Continuous Vibration Levels[1]

Velocity Level, PPV (in/sec)	Human Reaction	Effect on Buildings
0.006 to 0.019	Threshold of perception: Possibility of intrusion	Vibration unlikely to cause damage of any type
0.08	Vibrations readily perceptible	Recommended upper level of the vibration to which ruins and ancient monuments should be subjected
0.10	Level at which continuous vibrations begin to annoy people	Virtually no risk of "architectural" damage[2] to normal buildings
0.20	Vibrations annoying to people in buildings	Threshold at which there is a risk of "architectural" damage to normal dwellings such as plastered walls or ceilings.
0.4 to 0.6	Vibrations considered unpleasant by people subjected to continuous vibrations	Vibration at this level would cause "architectural" damage and possibly minor structural damage.

b. Light-Rail/ Heavy-Rail Vibration

Rail operations are potential sources of substantial ground-borne vibration depending on distance, the type and the speed of trains, and the type of railroad track. People's response to ground-borne vibration has been correlated best with the velocity of the ground. The

[1] Transportation Related Earthborne Vibrations. Caltrans, Technical Advisory, TAV-02-01-R9601, February 2002.

[2] "Architectural" damage is cosmetic in nature, involving minor cracking of building elements, and would not affect the structural integrity of the building.

velocity of the ground is expressed on the decibel scale. The reference velocity is 1 x 10^{-6} in. /sec. RMS, which equals 0 VdB, and 1 in. /sec. equals 120 VdB. Although not a universally accepted notation, the abbreviation "VdB" is used in this document for vibration decibels to reduce the potential for confusion with sound decibels.

One of the problems with developing suitable criteria for ground-borne vibration is the limited research into human response to vibration and more importantly human annoyance inside buildings. The U.S. Department of Transportation, Federal Transit Administration has developed rational vibration limits that can be used to evaluate human annoyance to ground-borne vibration. These criteria are primarily based on experience with passenger train operations, such as rapid transit and commuter rail systems. The main difference between passenger and freight operations is the time duration of individual events; a passenger train lasts a few seconds whereas a long freight train may last several minutes, depending on speed and length.

c. Heavy Trucks and Buses

Ground-borne vibration levels from heavy trucks and buses are not normally perceptible, especially if roadway surfaces are smooth. Buses and trucks typically generate ground-borne vibration levels of about 63 VdB at a distance of 25 feet when traveling at a speed of 30 mph. Higher vibration levels can occur when buses or trucks travel at higher rates of speed or when the pavement is in poor condition. Vibration levels below 65 VdB are below the threshold for human perception.

B. Regulatory Framework

This section describes the relevant guidelines, policies, and standards established by Federal and State Agencies and the City of San Jose.

1. Federal

a. Department of Housing and Urban Development (HUD)

HUD environmental criteria and standards are presented in 24 CFR Part 51. New residential construction qualifying for HUD financing proposed in high noise areas (exceeding 65 dBA DNL) must incorporate noise attenuation features to maintain acceptable interior noise levels. A goal of 45 dBA DNL is set forth for interior noise levels and attenuation requirements are geared toward achieving that goal. It is assumed that with standard construction any building will provide sufficient attenuation to achieve an interior level of 45 dBA DNL or less if the exterior level is 65 dBA DNL or less. Approvals in a "normally unacceptable noise zone" (exceeding 65 decibels but not exceeding 75 decibels) require a minimum of 5 decibels additional noise attenuation for buildings if the day-night average is greater than 65 decibels but does not exceed 70 decibels, or minimum of 10 decibels of additional noise attenuation if the day-night average is greater than 70 decibels but does not exceed 75 decibels.

b. Federal Highway Administration

Proposed federal or federal-aid highway construction projects at a new location, or the physical alteration of an existing highway that significantly changes either the horizontal or vertical alignment, or increases the number of through-traffic lanes requires an assessment of noise and consideration of noise abatement per Title 23 of the Code of Federal Regulations, Part 772 (23 CFR Part 772), "Procedures for Abatement of Highway Traffic Noise and Construction Noise." FHWA has adopted noise abatement criteria (NAC) for sensitive receivers such as picnic areas, recreation areas, playgrounds, active sport areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals when "worst-hour" noise levels approach or exceed 67 dBA Leq. Caltrans has further defined approaching the NAC to be 1 dBA below the NAC for noise sensitive receivers identified as Category B activity areas (e.g., 66 dBA Leq is considered approaching the NAC).[3]

c. Federal Transit Administration

The Federal Transit Administration (FTA) has identified vibration impact criteria for sensitive buildings, residences, and institutional land uses near rail transit and railroads. The thresholds for residences and buildings where people normally sleep (e.g., nearby residences) are 72 VdB for frequent events (more than 70 events of the same source per day), 75 VdB for occasional events (30 to 70 vibration events of the same source per day), and 80 VdB for infrequent events (less than 30 vibration events of the same source per day).

2. State of California

a. California Administrative Code Section 65302(f)

California Government Code Section 65302(f) requires that all General Plans include a Noise Element to address noise problems in the community. The noise element shall recognize the guidelines established by the Office of Noise Control in the State Department of Health Services and shall analyze and quantify, to the extent practicable, as determined by the legislative body, current and projected noise levels for all of the following sources:

- Highways and freeways.

[3] Traffic Noise Analysis Protocol, Caltrans Division of Environmental Analysis, August 2006.

- Primary arterials and major local streets.

- Passenger and freight on-line railroad operations and ground rapid transit systems.

- Commercial, general aviation, heliport, and military airport operations, aircraft flyovers, jet engine tests stands and all other ground facilities and maintenance functions related to airport operation.

- Local industrial plants, including, but not limited to, railroad classification yards.

- Other stationary ground noise sources identified by local agencies as contributing to the community noise environment.

Noise contours shall be shown for all of these sources and stated in terms of community noise equivalent level (CNEL) or day-night average level (L_{dn}). The noise contours shall be prepared on the basis of noise monitoring or following generally accepted noise modeling techniques for the various sources identified above.

The noise contours shall be used as a guide for establishing a pattern of land uses in the land use element that minimizes the exposure of community residents to excessive noise. The noise element shall include implementation measures and possible solutions that address existing and foreseeable noise problems, if any. The adopted noise element shall serve as a guideline for compliance with the state's noise insulation standards.

b. California Noise Insulation Standards

The State of California establishes minimum noise insulation performance standards for hotels, motels, dormitories, apartment houses, and dwellings other than detached single-family dwellings as set forth in the 2007 California Building Code (Chapter 12, Appendix Section 1207.11.2). The noise limit is a maximum interior noise level of 45 dBA DNL. Where exterior noise levels exceed 60 dBA DNL, a report must be submitted with the building plans describing the noise control measures that have been incorporated into the design of the project to meet the noise limit. The General Plan facilitates the implementation of the Building Code noise insulation standards.

c. Division of Aeronautic Noise Standards

Title 21 of the *California Code of Regulations*[4] sets forth the State's airport noise standards. In the findings described in Section 5006, the standard states the following: "A level of noise acceptable to a reasonable person residing in the vicinity of an airport is established as a community noise equivalent level (CNEL) value of 65 dB for purposes of these regulations. This criterion level has been chosen for reasonable persons residing in urban residential areas where houses are of typical California construction and may have windows partially open. It has been selected with reference to speech, sleep, and community reaction." Based on this finding, the airport noise standard as defined in Section 5012 is set at a CNEL of 65 dB.

d. California Department of Transportation – Construction Vibration

There are no applicable state plans, policies, regulations or laws related to ground-borne vibration from construction activities, but guidance developed by the California Department of Transportation (Caltrans) has been used in past construction vibration impact assessments of projects developed in San José. Caltrans uses a vibration limit of 12.7 mm/sec (0.5 inches/sec), PPV for buildings structurally sound and designed to modern engineering standards. A conservative vibration limit of 5 mm/sec (0.2 inches/sec), PPV has been used for buildings that are found to be structurally sound but structural damage is a major concern. For historic buildings or buildings that are documented to be structurally weakened, a conservative limit of 2 mm/sec (0.08 inches/sec), PPV is often used to provide the highest level of protection. All of these limits have been used successfully and compliance to these limits has not been known to result in appreciable structural damage. All vibration limits referred to herein apply on the ground level and take into account the response of structural elements (i.e. walls and floors) to ground-borne excitation.

3. City of San José

a. San José 2020 General Plan

The Noise Element of the San José 2020 General Plan identifies noise and land use compatibility standards for various land uses. The City's goal is to, "…minimize the impact of noise on people through noise reduction and suppression techniques, and through appropriate land use policies." Policies and programs in support of these goals are as follows:

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[4] California Code of Regulations Airport Noise Standards, Title 21, Public Works Division 2.5, Division of Aeronautics (Department of Transportation), Chapter 6 Noise Standards, Article 1.General.

Policy 1. The City's acceptable noise level objectives are 55 DNL as the long-range exterior noise quality level, 60 DNL as the short-range exterior noise quality level, 45 DNL as the interior noise level, and 76 DNL as the maximum exterior noise level necessary to avoid significant adverse health effects. These objectives are established for the City, recognizing that the attainment of exterior noise levels in the environs of the San José International and Reid-Hillview airports the Downtown Core Area, and along major roadways may not be achieved in the time frame of this Plan. To achieve the noise objectives, the City should require appropriate site and building design, building construction and noise attenuation techniques in new residential development.

Policy 2. The City should include appropriate attenuation techniques in the design of all new arterial streets.

Policy 3. The City should encourage the State Department of Transportation and County Transportation Agency to provide sound attenuation devices which are visually pleasing on all new and existing freeways and expressways.

Policy 4. The City should monitor Federal legislative and administrative activity pertaining to aircraft noise for new possibilities for noise-reducing modifications to aircraft engines beyond existing Stage 3 requirements. In addition, the City should monitor ongoing FAA study group discussions pertaining to land use around airports and oppose Federal policies pre-empting local land use authority. The City should monitor any efforts at the Federal level to revise or modify the Federal schedule for phase-out of Stage 2 aircraft. The City should continue to encourage the use of quieter aircraft at the San Jose International and Reid-Hillview airports.

Policy 5. The City should continue to require safe and compatible land uses within airport noise zones (defined by the 65 CNEL contour as set forth in State law) and should also encourage operating procedures which minimize noise.

Policy 6. The City should continue to encourage the Federal Aviation Administration to enforce current cruise altitudes which minimize the impact of aircraft noise on land use.

Policy 7. The use of off-road vehicles such as trail bikes, mini-bikes and dune buggies should only be allowed in areas where the resulting noise is consistent with the City's exterior noise level guidelines and is compatible with adjacent land uses.

Policy 8. The City should discourage the use of outdoor appliances, air conditioners, and other consumer products which generate noise levels in excess of the City's exterior noise level guidelines.

Policy 9. Construction operations should use available noise suppression devices and techniques.

Policy 10. Commercial drive-through uses should only be allowed when consistency with the City's exterior noise level guidelines and compatibility with adjacent land uses can be demonstrated.

Policy 11. When located adjacent to existing or planned noise sensitive residential and public/quasi-public land uses, nonresidential land uses should mitigate noise generation to meet the 55 DNL guideline at the property line.

Policy 12. Noise studies should be required for land use proposals where known or suspected peak event noise sources occur which may impact adjacent existing or planned land uses.

Table 4 shows the compatibility of various land use categories with varying noise levels.

Table 4 Land Use Compatibility Guidelines for Community Noise in San Jose

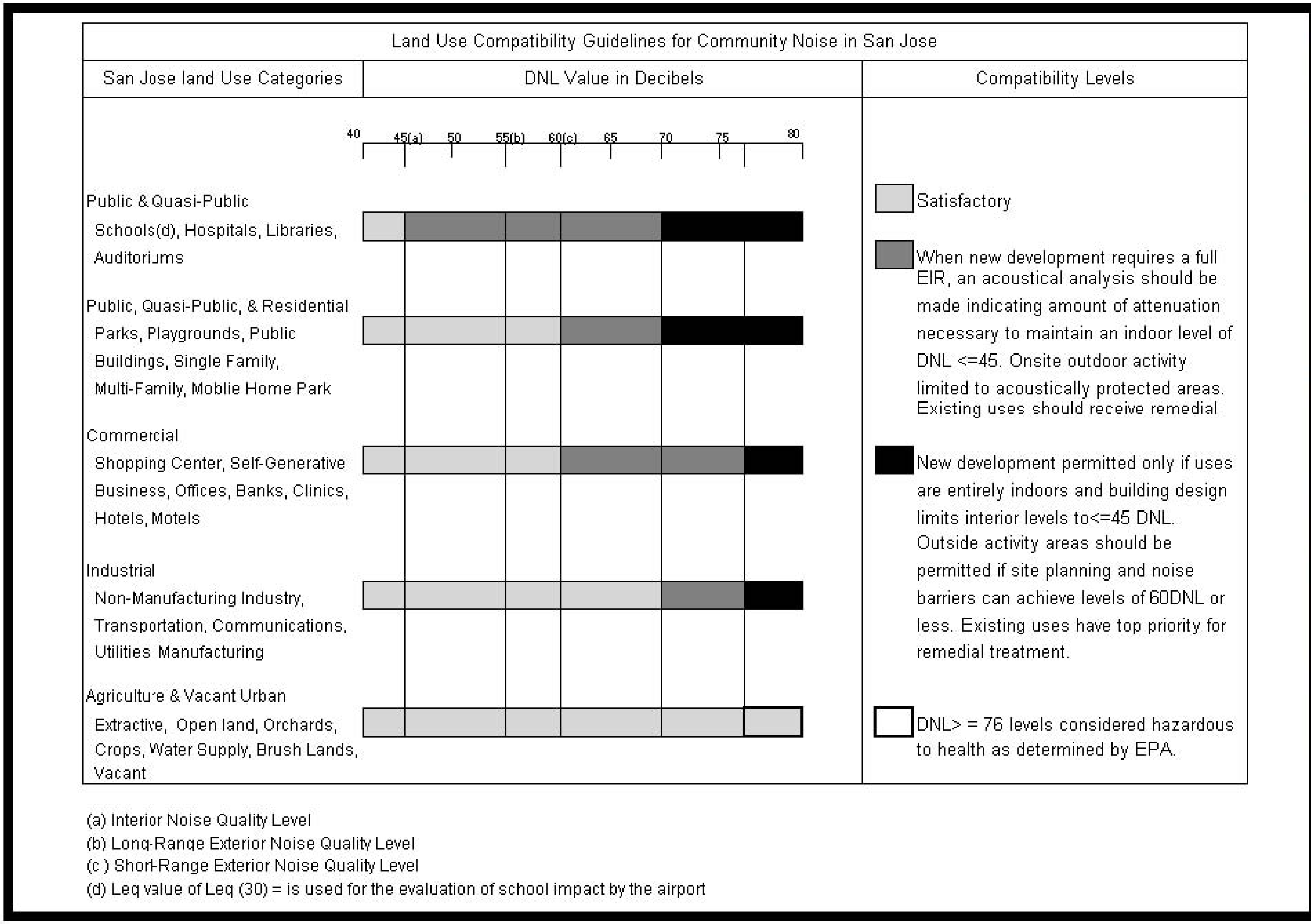

Figure 16. Land Use Compatibility Guidelines for Community Noise

Source: Noise Element of the City of San Jose's General Plan, Chapter 4

b. City of San José Municipal Code

The City's Municipal Code contains a Zoning Ordinance that limits noise levels at any property line of residential, commercial, or industrial properties as shown in Table 5.

Table 5 City of San José Zoning Ordinance Noise Standards

Land Use Types	Maximum Noise Level in Decibels at Property Line
Residential, open space, industrial or commercial uses adjacent to a property used or zoned for residential purposes	55
Open space, commercial, or industrial use adjacent to a property used or zoned for commercial purposes or other non-residential uses	60
Industrial use adjacent to a property used or zoned for industrial or use other than commercial or residential purposes	70

The City's Municipal Code also contains a Zoning Ordinance that limits noise levels generated by stand-by/backup and emergency generators. The noise level emitted by these generators shall not exceed 55 decibels at the property line of residential properties. The standards and criteria for stand-by/ backup generators are set as follows:

1. Maximum noise levels, based upon a noise analysis by an acoustical engineer, will not exceed the applicable noise standards set forth in Title 20.80.2030.
2. Testing of generators is limited to 7 a.m. to 7 p.m., Monday through Friday.

C. Existing Conditions

1. Noise

Existing noise conditions within the City of San José were documented through a noise monitoring survey for the General Plan Update completed in February and March 2009. In addition, noise data collected by Illingworth & Rodkin, Inc. since 2005 were utilized to supplement the General Plan Update noise monitoring survey. Appendix A summarizes the locations and results of the noise measurements by Planning Area.

a. Transportation-Related Noise Sources

The ambient noise environment in San José is predominantly the result of transportation-related noise sources. U.S. Highway 101, Interstates 280, 680, and 880, and State Routes 17, 82, 85, 87, and 237 are the most significant sources of traffic noise throughout the community. In areas removed from highways, local arterial and collector roadways are the primary noise sources at nearby land uses.

Aircraft operations associated with Norman Y. Mineta San José International Airport and Reid-Hillview Airport generate noise that varies throughout the community. Near primary flight paths and the airports, these operations are substantial contributors to ambient day-night average noise levels. In portions of the City away from the airports and flight paths, aircraft generate noise levels that are audible at times.

Helicopter operations associated with hospital heliports intermittently generate fairly high noise levels over short periods of time. Although audible over a large area, hospital helipads do not normally make a substantial contribution to ambient day-night average noise levels at neighboring residences.

Rail operations along the Valley Transportation Authority (VTA) rights-of-way and along Union Pacific Railroad rights-of-way also are substantial sources of noise in some areas of the City. There are three light-rail lines that are located primarily along major transportation corridors including Capitol Avenue, Tasman Drive, North First Street, SR-85, and SR-87. Heavy-rail tracks generally traverse the City from north to south from the Peninsula and East Bay. In addition to UPRR freight trains, rail operators also include the Altamont Commuter Express (ACE), Caltrain, and Amtrak. Day-night average noise levels vary throughout the community depending on the number of trains operating along a given line per day, the timing and duration of train passby events, and whether or not trains must sound their warning whistles. Day-night average noise levels commonly range from 65 to 75 dBA DNL at land uses adjoining a railroad right-of-way. When railroad trains approach a passenger station or "at-grade" crossing, they are required to use their warning horn by sounding a short signal with the horn. When giving a warning to people and/or animals, they are required to produce a succession of sounds with the horn. Trains are required to sound a long signal followed by a short signal when approaching stations, curves, or other points where view may be obscured, and when approaching passenger or freight trains. When passing a standing train, the moving train is required to sound two long signals followed by a short signal followed by a long signal, the same requirement when signaling for at-grade crossings. Train warning whistles can generate maximum noise levels of approximately 105 dBA at 100 feet.

b. Stationary Noise Sources

Industrial operations are the primary stationary noise sources that make a significant local contribution to community noise levels. In general, these stationary noise sources (e.g. fabrication, large mechanical equipment and loading areas) are often located in primarily commercial and industrial areas and are isolated from noise sensitive land uses. However, sensitive development has encroached on some of these stationary noise sources resulting in some land use conflicts. Noise sources that affect sensitive receptors within the community would also include commercial land uses or those normally associated with and/or secondary to residential development. These include nightclubs, outdoor dining areas, gas stations, car washes, fire stations, drive-throughs, air conditioning units, swimming pool pumps, school playgrounds, athletic and music events, and public parks.

c. Temporary Noise Sources

Construction is a temporary source of noise for residences and businesses located near construction sites. Construction noise can be significant for short periods of time at any particular location as a result of public improvement projects, private development projects, remodeling, etc. The highest construction noise levels are normally generated during grading and excavation, with lower noise levels occurring during building construction. Large pieces of earth-moving equipment, such as graders, scrapers, and bulldozers, generate maximum noise levels of 85 to 90 dBA at a distance of 50 feet. Typical hourly average construction-generated noise levels are about 80 to 85 dBA measured at a distance of 50 feet from the site during busy construction periods. Some construction techniques, such as impact pile driving, can generate very high levels of noise (105 dBA L_{max} at 50 feet) that are difficult to control. Construction activities can elevate noise levels at adjacent businesses and residences by 15 to 20 dBA or more.

2. Vibration

a. Transportation-Related Vibration Sources

Ground-borne vibration occurs in areas adjacent to fixed rail lines when railroad trains pass through San Jose. Ground vibration levels along the railroad corridors are proportional to the speed and weight of the trains as well as the condition of the tracks and train engine and car wheels. Vibration levels resulting from railroad trains vary by site, but are generally perceptible within 100 feet of the tracks. Light-rail operations generate less vibration than heavy-rail trains, and oftentimes, vibration levels generated by light-rail trains are barely perceptible just outside the common light-rail/roadway right-of-way.

b. Temporary Vibration Sources

Construction activities such as demolition, site preparation work, excavation, and foundation work can generate ground-borne vibration at land uses adjoining construction sites. Impact pile driving has the potential of generating the highest ground vibration levels and is of primary concern to structural damage. Other project construction activities, such as caisson drilling, the use of jackhammers, rock drills and other high-power or vibratory tools, and rolling stock equipment (tracked vehicles, compactors, etc.) may also generate substantial vibration levels in the immediate vicinity.

3. Planned Rapid and Rail Transit

Currently, California is considering construction of a high-speed train system that would link the San Francisco Bay Area and Los Angeles. The plan would be for high-speed trains to operate through San José on or near the existing Caltrain right-of-way. High-speed trains would operate on dedicated tracks. Numerous at-grade crossings would need to be eliminated or a grade-separated track would be necessary to facilitate the high-speed trains. This may reduce noise from the sounding of traditional railroad train horns. The high-speed trains would likely use electric power cars, which would minimize the low frequency rumble, associated with diesel-powered locomotives. At higher speeds above conventional trains, high-speed train noise levels would increase over conventional trains due to the aerodynamic effects. It is not possible to quantify future noise levels in the rail corridor. Vibration of the ground caused by the passby of high-speed trains is similar to that caused by conventional steels wheels/steel rail trains. At comparable speeds, vibration levels associated with high-speed trains are relatively lower than conventional passenger and freight trains due to advanced track technology, smooth track and wheel surfaces, and high maintenance standards required for high-speed operation. Conversely, vibration levels increase with increasing speed, so the previously described benefits would be at least partially offset by higher operating speeds.[5] As information becomes available, it should be incorporated into the Noise Element and utilized in noise/vibration and land use planning accordingly.

A former UPRR railroad right-of-way is designated as the Silicon Valley Rapid Transit Corridor where the BART extension to San Jose is planned. Noise levels resulting from the operation of the proposed BART extension were assessed in the Silicon Valley Rapid Transit Corridor Final EIR.[6] The SVRTC study predicts wayside noise levels for BART operations of 60 dBA DNL at approximately 144 feet from the near track. Maximum passby noise levels are predicted to be approximately 76 dBA L_{max} at 88 feet.[7]

Rapid transit along the future BART Extension would also be a source of ground-borne vibration. Predicted ground vibration levels without mitigation are presented in the Silicon

[5] Final Bay Area to Central Valley High-Speed Train (HST) Program Environmental Impact Report/Environmental Impact Statement (EIR/EIS), Volume 1: Report May 2008.
[6] Silicon Valley Rapid Transit Corridor Final EIR, prepared by Santa Clara Valley Transportation Authority, November 2004.
[7] SVRTC FEIR, pages 4.13-16 and 4.13-17.

Valley Rapid Transit Corridor FEIR.[8] Based on data contained in the SVRTC FEIR, the 72 VdB threshold is estimated to occur within approximately 100 feet of the near track without mitigation.

4. Planning Areas

The City of San José's Urban Growth Boundary covers approximately 143 square miles and there are a range of noise sources and levels throughout the City. For the purposes of this report, City of San José Planning Areas are utilized to describe noise levels throughout the City. The City of San José is divided into fifteen Planning Areas: Alviso (ALV), North (NOR), Berryessa (BER), West Valley (WV), Central (CEN), Alum Rock (AR), Willow Glen (WG), South (SOU), Evergreen (EVE), Cambrian/Pioneer (CP), Edenvale (EDE), Almaden (ALM), Coyote (COY), San Felipe (SF), and Calero (CAL). Figures showing approximate noise measurement locations made in each of the Planning Areas and summary tables of these noise measurement data are shown in Appendix A.

a. Alviso (ALV)

The Alviso Planning Area is the northernmost planning area in San José and is comprised mostly of wetlands, airport approach zone land uses, and residential communities. The main sources of noise in the Alviso Planning Area include State Route 237 and Interstate 880, railroad train operations along the UPRR, and aircraft. Noise measurement ALV-1 was made along State Route 237 yielding a Day-Night Average noise level of 74 dBA DNL. Other major noise-generating roadways include North First Street, Gold Street, Los Esteros Road, and Zanker Road. Noise-sensitive land uses are generally located in areas well away from stationary noise sources (e.g., Zanker Road Landfill).

b. North (NOR)

The North Planning Area of the City of San José is predominately comprised of commercial and industrial land-uses with sparse low, medium, and high density residential in some northern portions. The area's predominant noise source is the Norman Y. Mineta San José International Airport. The 2010 noise contours for Norman Y. Mineta San José International Airport are shown on Figure 1. The 65 dBA CNEL noise contour generated by San José International Airport extends from north of Tasman Drive to about Keyes Street in the south (Central Planning Area). The airport averages about 533 aircraft operations per day.[9] Approximately 60 percent of aircraft operations are commercial, 19 percent are transient

[8] SVRTC FEIR, Table 4.13-17, page 4.13-54.

[9] FAA Information for Norman Y. Mineta San Jose International Airport, website: www.airnav.com/airport/KSJC, Effective March 12, 2009.

general aviation, 13 percent are jet air taxi operations, 8 percent are local general aviation, and less than 1 percent are military operations. The airport sets noise-based curfew hours from 11:30 P.M. to 6:30 A.M. The noise-based curfew prohibits takeoffs or landings within curfew hours exceeding an average of 89 decibels[10]. Other major sources of noise include State Route 237 along the northern border, Interstate 880 along the eastern border, Highway 101 in the southern third of the Planning Area, and State Route 87. Major arterial roadways include West Tasman Drive, Montague Expressway, North First Street, Zanker Road, West Trimble Road, and East Brokaw Road. Two VTA Light Rail lines, Alum Rock to Santa Teresa and Mountain View to Winchester, run along West Tasman Drive and North First Street. Noise measurements conducted in the North Planning Area include NOR-1 to NOR-8, which yielded Day-Night Average noise levels ranging from 60 to 71 dBA DNL.

c. Berryessa (BER)

The Berryessa Planning Area is located in the northeast portion of the City of San José north of the Alum Rock and Central Planning Areas. Medium-low and low density residential land uses are predominant in the western half of the Berryessa Planning Area. Other land uses include public parks, commercial, and high density residential along Interstate 680. The eastern half of the Planning Area includes land uses such as low density and rural residential, campus industrial, urban and non-urban hillside, and open space. Major sources of noise primarily include highways, arterial roadways, and three rail lines. Interstate 680 transects the western half of the Planning Area roughly two miles east of Interstate 880, which serves as the westernmost boundary. A small portion of Highway 101 serves as the southernmost border of the Planning Area. Major arterial roadways include Oakland Road, Murphy Avenue, Berryessa Road, North Capitol Avenue, Cropley Avenue, Morrill Avenue, Piedmont Road, and Sierra Road. Noise measurement BER-1 along Interstate 680 showed a Day-Night Average noise level of 74 dBA DNL. A Day-Night Average noise level of 65 dBA DNL was measured at BER-2 along Interstate 880. Noise measurement BER-3 yielded a Day-Night Average noise level of 59 dBA DNL along Berryessa Road. Two Union Pacific freight-train railroads run almost parallel between the two interstates and the Alum Rock to Santa Teresa portion of the VTA Light Rail cuts across and runs along North Capitol Avenue.

Graniterock (San José Concrete and Building Materials) is located at 11711 Berryessa Road. The major noise sources produced by this facility include a truck loading and unloading activities, rail car shaking, slack action, movement of freight cars and engines on the spur line leading to the facility and truck movements. Measurements made at existing and planned (Flea Market site) residential land uses in the vicinity range from 58 to 62 dBA DNL.

[10] Website: www.sjc.org/newsroom/AirportStats.pdf

d. West Valley (WV)

The major source of environmental noise in the West Valley Planning Area (WV), located in the central west portion of the City of San José, is vehicular traffic. Interstates 280 and 880, and State Routes 17, 82 and 85 are the most significant sources of traffic noise. Major arterials, including Saratoga Avenue, San Tomas Expressway, Bollinger Road, Stevens Creek Boulevard, Moorpark Avenue, Williams Road, Lawrence Expressway, Hamilton Avenue, De Anza Boulevard, Prospect Road, Winchester Boulevard, Bascom Avenue, Pruneridge Avenue and Homestead Road are the most significant noise sources at land uses immediately joining these roadways. Other noise sources that contribute to community noise levels include VTA light rail trains that run from the northeast to the southwest portions of the Planning Area, and freight trains that run from the northeast to the southwest and west towards the Hanson Permanente quarry in Cupertino. The West Valley Planning Area is mainly developed with residential and commercial land uses. Noise measurements made by Illingworth & Rodkin, Inc. since 2005 documented ambient noise levels along Interstates 280 and 880, State Routes 17, 82, and 85, and major roadways. Noise measurements (WV-1 to WV-8) resulted in Day-Night Average noise levels ranging from 54 to 68 dBA DNL.

e. Central (CEN)

The Central Planning Area encompasses downtown San José and shares borders with the North, Berryessa, Alum Rock, South, Willow Glen, and West Valley Planning Areas. The northernmost point of the Planning Area adjoins the Highway 101 and Interstate 880 interchange. U.S. Highway 101 serves as the northeast border and Interstate 880 serves as the north and west borders for the Central Planning Area. In the southern portion, Interstate 280 serves as the southern border until crossing the State Route 87 interchange. Route 87 continues north through the Planning Area. Major arterial roadways include Bascom Avenue, Hedding Street, Naglee Avenue, West Taylor Street, West San Carlos Street/Stevens Creek Boulevard, Coleman Avenue, State Route 82/West Santa Clara Street, East Santa Clara Street, St. James Street, Julian Street, 1st Street, 3rd Street, 10th Street, 11th Street, 24th Street/McLaughlin Avenue, Keys Street/Story Road, Alma Avenue, and Almaden Expressway.

There are multiple railroads that contribute to the noise environment in the Central Planning Area. Two VTA Light Rail train lines, Alum Rock to Santa Teresa and Mountain View to Winchester, converge and split just north of the Guadalupe Parkway (Route 87) and Interstate 280 interchange. Also converging at this hub are separate train lines that run northwest/southeast and are utilized by Caltrain, Altamont Commuter Express (ACE), Amtrak Capitol Corridor, and Union Pacific freight trains. The Norman Y. Mineta San José International Airport is beyond the northwest border of the Planning Area, and as previously stated, the 65 dBA CNEL noise contour generated by the airport extends into the Planning

Area. Public parks, open space, and industrial/commercial land uses are within the Central Planning Area nearest the airport runways. General commercial land uses are located along Stevens Creek/West San Carlos Street, East Santa Clara Street, North 1st and 2nd streets, Monterey Street/South 1st Street, and Story Road. High-density residential land uses are located primarily within the Downtown Core Area and south of San José State University. Medium and low-density residences account for the majority of land uses in the Planning Area apart from the downtown and airport spheres of influence. Medium-high density residential, small parks, and light industrial land uses make up a smaller portion of the Planning Area comparatively. Sixteen long-term noise measurements (CEN-1 to CEN-16) taken from 2006 to 2009, documented ambient noise levels within the Planning Area. Measured noise levels varied with distance from the noise source, but typically ranged from 62 to 75 dBA DNL.

f. Alum Rock (AR)

The Alum Rock Planning Area (AR) is located in the northeast portion of the City of San José and is also primarily affected by noise from traffic and aircraft. The Planning Area is mainly developed with residential land uses, with commercial land uses concentrated along Alum Rock Avenue. Interstates 280 and 680, Highway 101 and State Route 130 (Alum Rock Avenue) generate the highest noise levels. Major arterials, including Capitol Avenue/Expressway, White Road, King Road, Story Road, McKee Road, Jackson Avenue, Ocala Avenue, Tully Road, Toyon Avenue, Kirk Avenue, Clayton Road, Mount Pleasant Road, and Fleming Avenue are the most significant noise sources at land uses immediately joining these roadways. Five long-term noise measurements (AR-1 to AR-5) were taken between 2006 and 2009 to document ambient noise levels within the Planning Area. Noise levels in areas adjacent to King Road, Alum Rock Avenue, McKee Road, and Story Road ranged from 70-74 dBA DNL, while noise levels in residential settings were approximately 55 dBA DNL.

Reid-Hillview Airport is located at 2500 Cunningham Avenue west of East Capitol Expressway and north of Tully Road is also a significant source of environmental noise. This general aviation airport averages 630 aircraft operations per day[11]. Approximately 60 percent of aircraft operations are general aviation, and 40 percent are transient general aviation. The airport operates from 7:00 A.M. to 9:00 P.M.[12]. Figure 2 shows the existing noise contours[13] of Reid-Hillview Airport.

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[11] FAA Information for Reid-Hillview Airport, website: www.airnav.com/airport/KSJC, Effective January 15, 2009.

[12] www.reidhillviewairport.com/new_website/rhv-noise.html

[13] www.sccgov.org/portal/site/planning/RHV_Fig1-8.pdf

Other sources that contribute to community noise levels include VTA light rail and freight trains that run from the south to the north of the Planning Area as well as intermittent helicopter operations associated with Regional Medical Center.

g. Willow Glen (WG)

The Willow Glen Planning Area (WG) is located in the southwest portion of the City of San Jose, and is mainly developed with residential land uses. Interstates 280 and 880, and State Routes 17 and 87 are the most significant sources of traffic noise. Major arterials include Southwest Expressway, Camden Avenue, Hillsdale Avenue, Foxworthy Avenue, Bascom Avenue, Curtner Avenue, Pine Avenue, Hamilton Avenue, Moorpark Avenue, Leigh Avenue, Meridian Avenue, Lincoln Avenue, Bird Avenue, Union Avenue, Minnesota Avenue, Willow Street, Alma Avenue, Almaden Expressway, West Virginia Street, and Race Street. VTA light-rail trains along the Mountain View to Winchester line pass through the Planning Area. The Valley Medical Center heliport also generates noise that intermittently increases ambient noise levels within the community. Nine noise measurements (WG-1 to WG-9) made by Illingworth & Rodkin, Inc. since 2005 documented ambient noise levels along Interstates 280 and 880, State Routes 17 and 87, and major roadways. Measured noise levels within the Planning Area ranged from 65 to 74 dBA DNL.

h. South (SOU)

The South Planning Area (SOU) is located south of the Central Planning Area and is primarily developed with residential and commercial land uses. Traffic and aircraft are the predominant sources of noise affecting the ambient noise environment in the South Planning Area. Highway 101, and State Routes 82 (Monterey Road) and 87 are the most significant sources of traffic noise. Major arterials include Capitol Expressway, Hillsdale Avenue, Curtner Avenue, Tully Road, Story Road, Senter Road, and McLaughlin Avenue. Aircraft on approach or departure routes from the Norman Y. Mineta San Jose International Airport also contribute to measured noise levels. Noise measurements made by Illingworth & Rodkin, Inc. since 2005 documented ambient noise levels along Highway 101, State Routes 82 and 87, and major roadways. Measured noise levels (SOU-1 and SOU-2) in the vicinity of major thoroughfares such as Tully Road and Capitol Expressway range from 73 to 74 dBA DNL.

The Raisch Products Asphalt and Concrete Plant is located off Monterey Road near Pullman Way. The major noise sources on site include the asphalt batch plant, truck circulation, and railroad off-loading. Noise measurements conducted by Illingworth & Rodkin, Inc. in 2005 showed that the typical noise level generated by the plant is 63 to 64 dBA at a distance of 200 feet from the asphalt batch plant.

i. Evergreen (EVE)

The Evergreen Planning Area (EVE) is located in the central southeast portion of the City of San José. Highway 101 is the most significant source of traffic noise affecting the Planning Area. Major arterials, including Capitol Expressway, San Felipe Road, White Road, Story Road, Yerba Buena Road, Aborn Road, Quimby Road, Ruby Avenue, Mount Pleasant Road, Clayton Road, King Road, Silver Creek Road, Silver Creek Valley Road, Nieman Boulevard, Marten Avenue, and Murillo Avenue are also significant sources of noise at land uses immediately adjacent to these roadways. Reid-Hillview Airport is located just north of the Planning Area. Noise measurements made by Illingworth & Rodkin, Inc. since 2005 (EVE-1 to EVE-3) documented ambient noise levels along Highway 101, and major roadways, resulting in measured noise levels ranging from 62 to 77 dBA DNL depending on the proximity of the measurement to the noise source.

j. Cambrian/Pioneer (CP)

The Cambrian/Pioneer Planning Area (CP) is located in west San José. State Route 85 is the most significant source of traffic noise that affects the Planning Area. Major arterials, including Almaden Expressway, Capitol Expressway, Coleman Road, Blossom Hill Road, Branham Lane, Hillsdale Avenue, South Bascom Avenue, Union Avenue, Leigh Avenue, Meridian Avenue, Cherry Avenue, Camden Avenue, and Kooser Road are the most significant noise sources at land uses immediately adjacent to these roadways. Operations associated with the Good Samaritan Hospital heliport also generate noise that is intermittently audible within the community. The Cambrian/Pioneer Planning Area is mainly developed by residential land uses. The Planning Area is also developed with commercial land uses along Bascom Avenue, Hillsdale Avenue near Leigh Avenue, Almaden Expressway near State Route 85 and Capitol Expressway, and at the intersection of Branham Lane and Camden Avenue.

Noise measurement CP-1 was made along Almaden Expressway yielding a Day-Night Average noise level of 70 dBA DNL. State Route 85 generates existing day-night average noise levels ranging from 77 to 78 dBA DNL at 75 feet. Vehicle traffic along Blossom Hill Road generates a day-night average noise level of about 71 dBA DNL at 75 feet.

k. Edenvale (EDE)

The Edenvale Planning Area (EDE) Area is located in south central San José. The major source of noise in the Planning Area is traffic along highways, state routes, and roadways with Highway 101 and State Routes 82, 85, and 87 as the most significant sources of traffic noise. Major arterials, include Snell Avenue, Pearl Avenue, Capitol Expressway, Branham Lane, Chynoweth Avenue, Blossom Hill Road, Santa Teresa Boulevard, Coleman Road, and Winfield Boulevard. The Planning Area is mainly developed by residential land uses. Other sources that contribute to community noise levels include VTA light rail trains that run from the north to the south of the Planning Area along State Route 87, and from the northwest to the southeast along State Route 85. The UPPR, Amtrak, and Caltrain run from the north to the south along State Route 82 (Monterey Road). Noise measurements made by Illingworth & Rodkin, Inc. since 2005 (EDE-1 to EDE-5) documented ambient noise levels ranging from 66 to 72 dBA DNL along State Routes 85 and 87, and major roadways.

l. Almaden (ALM)

The Almaden Planning Area is located in the southwestern portion of the City of San José. The major source of noise is traffic along roadways. Major arterials, including Almaden Expressway, Coleman Road, Redmond Avenue, Camden Avenue, Meridian Avenue, Harry Road, and McKean Road are the most significant noise sources at land uses immediately adjacent to these roadways. The Planning Area is developed with residential land uses in the northeast portion, and with non-urban hillside and public park land uses in the southwest portion. Noise measurement ALM-1 was made along Almaden Expressway yielding a Day-Night Average noise level of 56 dBA DNL.

m. Coyote (COY)

Traffic is the major source of noise in the Coyote Planning Area (COY) located in the southern portion of the City of San Jose, with planning areas Calero to the west and San Felipe to the east. Highway 101 is the most significant source of traffic noise. Major arterials, including Santa Teresa Boulevard, Monterey Highway, Bailey Avenue, and Hale Avenue are the most significant noise sources at land uses immediately adjacent to these roadways. The Planning Area is mainly developed with residential and agricultural land uses. The IBM Campus is located north of Bailey Avenue between Monterey Highway and McKean Road. Coyote also is developed with public parks, open spaces, and private open spaces. Noise measurements made by Illingworth & Rodkin, Inc. since 2005 (COY-1 to COY-6) documented ambient noise levels ranging from 66 to 73 dBA DNL along Highway 101 and major roadways.

n. San Felipe (SF)

The San Felipe Planning Area is in the southeastern portion of San José outside the Urban Growth Boundary, mostly outside the City limits, and not planned for development. The Evergreen Planning Area is to the northwest and the Coyote Planning Area is to the west.

Primary noise sources include industrial operations and automobile traffic along San Felipe Road, Metcalf Road, and Las Animas Road. The Planning Area is comprised of private open space, non-urban hillside, and industrial park land uses.

o. Calero (CAL)

Calero is the southernmost planning area of San José with Almaden to the northwest and Coyote to the northeast. The Planning Area is outside the Urban Growth Boundary and mostly outside the City limits; it is comprised primarily of public park and non-urban hillside land uses. Calero is not planned for development. The primary noise source is automobile traffic along McKean Road.

D. Noise Map

SoundPlan Version V6.5, a three-dimensional ray-tracing computer program, was used to calculate existing traffic noise levels along major roadways, expressways, and highways throughout the City of San José. The noise map prepared based on existing conditions is shown on Figure 3. Calculations took into account the source of noise (traffic), the frequency spectra of the noise source, and the topography of the area. The geometric data used to create the model were based on GIS information provided by the City of San José. Existing average daily trip (ADT) data, provided by Fehr and Peers Transportation Consultants, and observed vehicle mix data and travel speeds were also input into the model. For highways and expressways, traffic volumes and truck mix data input into the model was based on information published by the California Department of Transportation (Caltrans). The predicted noise levels were then compared to measured noise levels for calibration purposes and adjustments were made as necessary to ensure an accurate model. Figures 4 and 5 provide noise contours for the north and south halves of San José, respectively. Table 6 presents existing day-night average noise levels at a reference distance of 75 feet from the center of the near travel lane for highways and expressways in San José.

Table 6 Existing Noise Levels along San José Highways and Expressways

Highway/Expressway Segment	DNL at 75 ft, dBA* Existing
Almaden Expwy - Camden to Redmond	68
Almaden Expwy - Foxworthy to Lincoln	71
Almaden Expwy - SR 85 to Blossom Hill	71
Capitol Expwy - Aborn to Silver Creek	71
Capitol Expwy - I-680 to Hostetter	70
Capitol Expwy - Ocala to Tully	71
Capitol Expwy - Senter to Monterey	70
I-280 - West of SR 17	81
I-280 - West of SR 87	82
I-280 - West of US 101	81
I-680 - North of Alum Rock	82
I-680 - South of Capitol Expwy	82
I-880 - North of I-280	80
I-880 - North of US 101	81
Lawrence Expwy - Doyle to Prospect	70
Montague Expwy - Lafayette to 1st	71
Montague Expwy - McCarthy to I-880	69
SR 17 - East of SR 9	79
SR 237 - West of I-880	82
SR 85 - East of SR 17	78
SR 85 - West of SR 87	77
SR 87 - South of Curtner	78
SR 87 - South of US 101	74
San Tomas Expwy - Williams to Payne	70
Southwest Expwy - Hamilton to Fruitdale	67
US 101 - North of I-680	82
US 101 - South of SR 85	80
US 101 - North of I-880	81

* Noise levels for Highways and Expressways are given at a distance of 75 feet from the center of the near direction of travel.

Figure 1: 2010 Noise Contours at Norman Y. Mineta San José International Airport

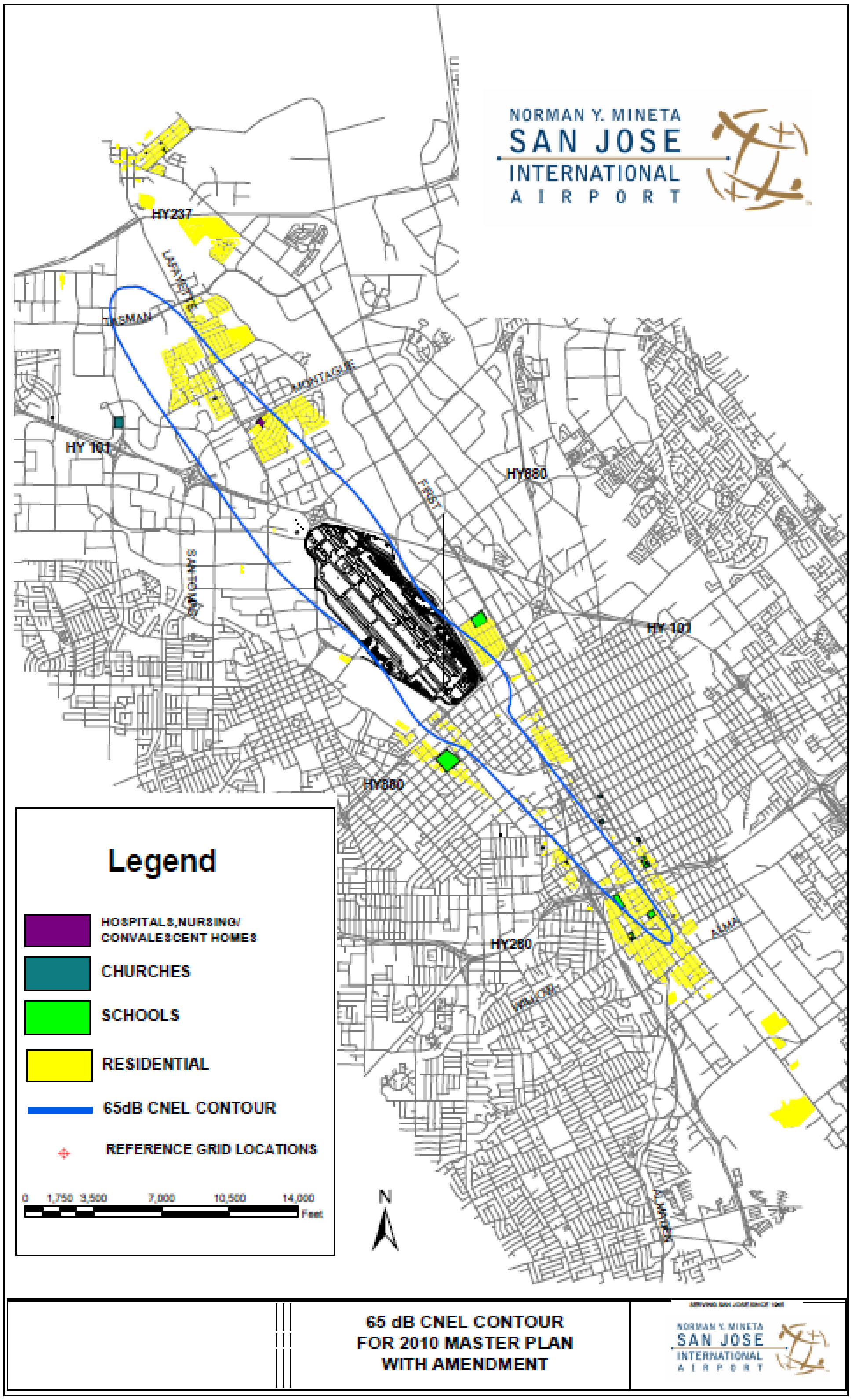

Figure 2: 2022 Noise Contours at Reid-Hillview Airport

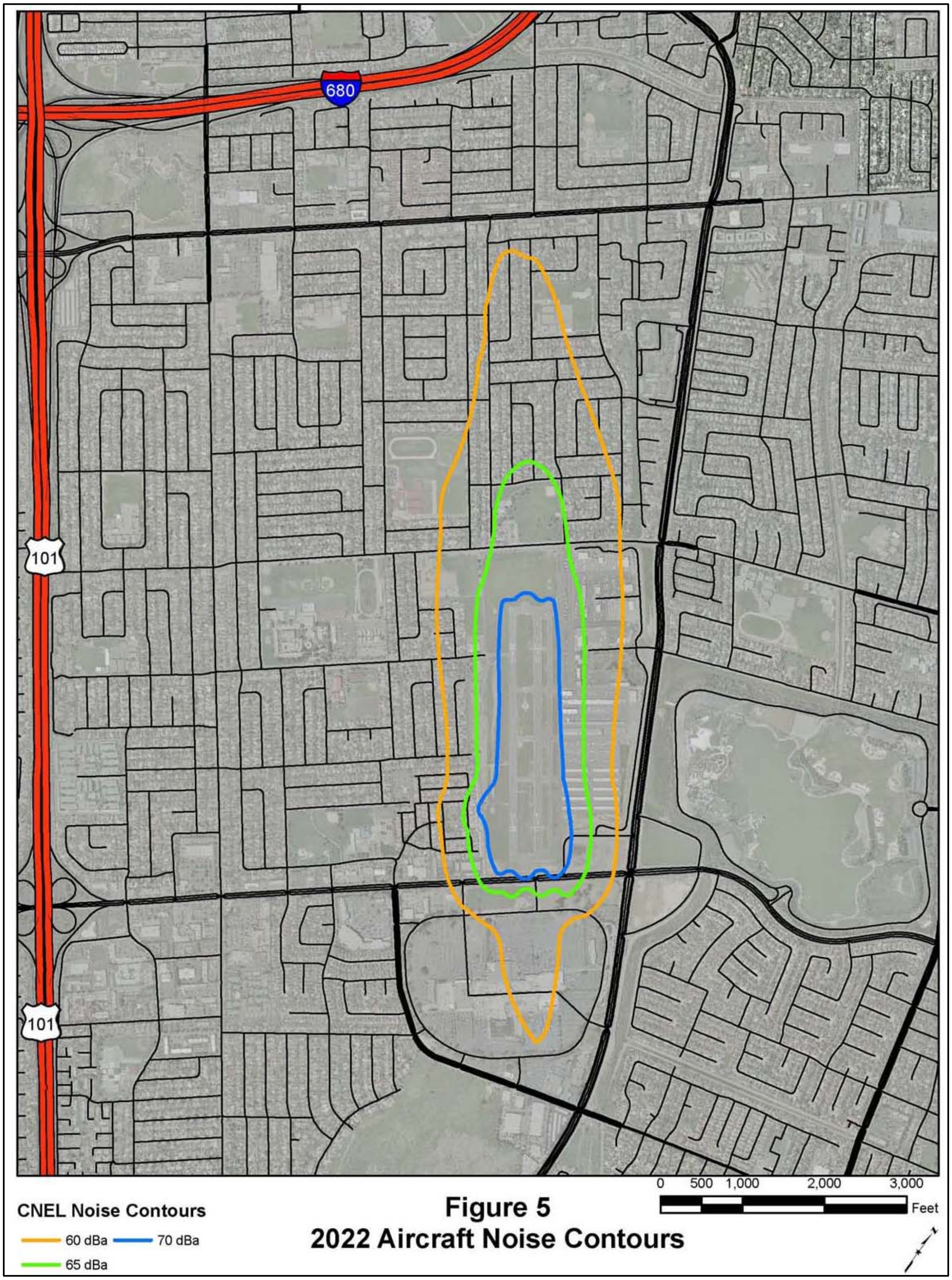

Figure 3: City of San Jose Noise Map

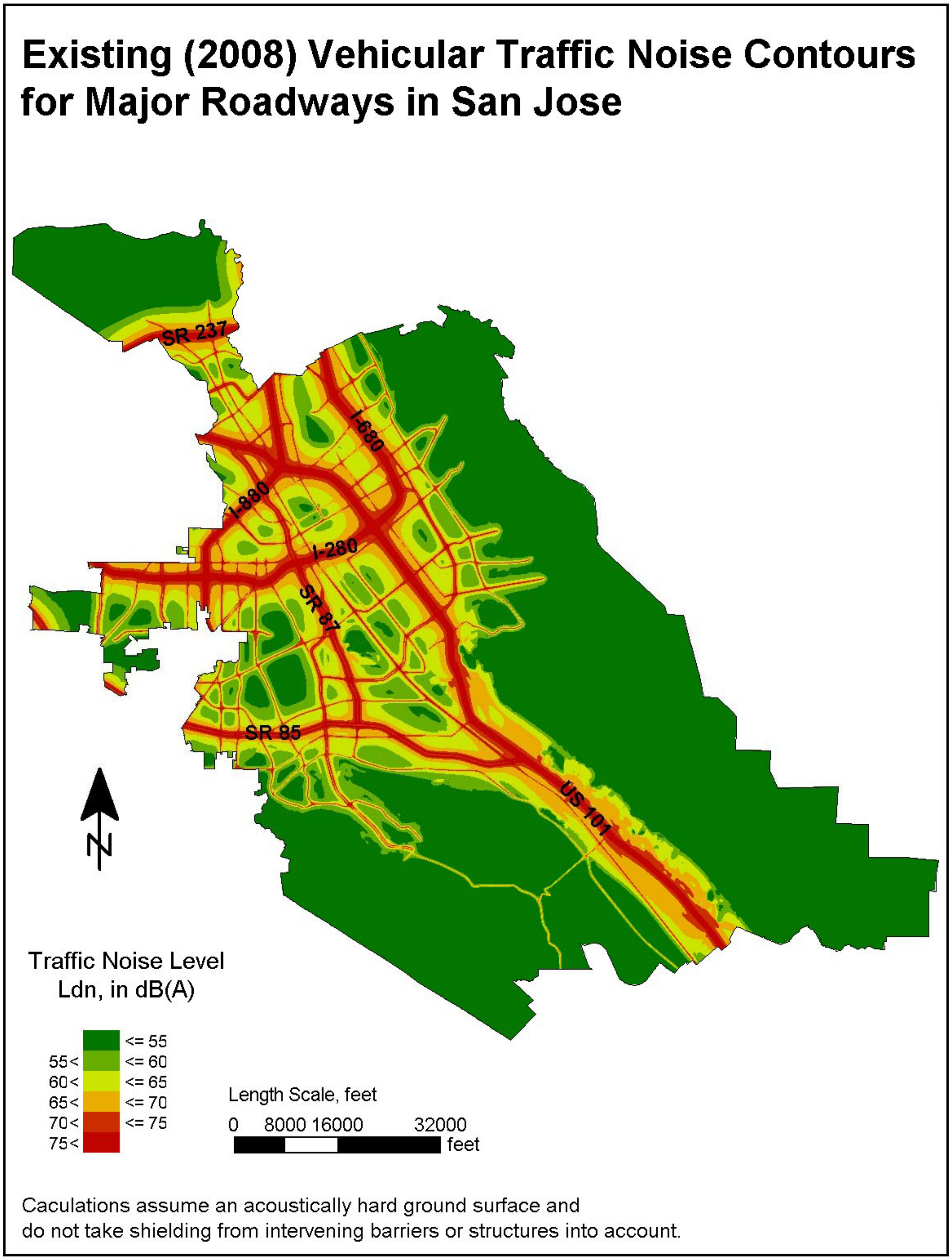

Figure 4: City of San Jose Noise Map (North)

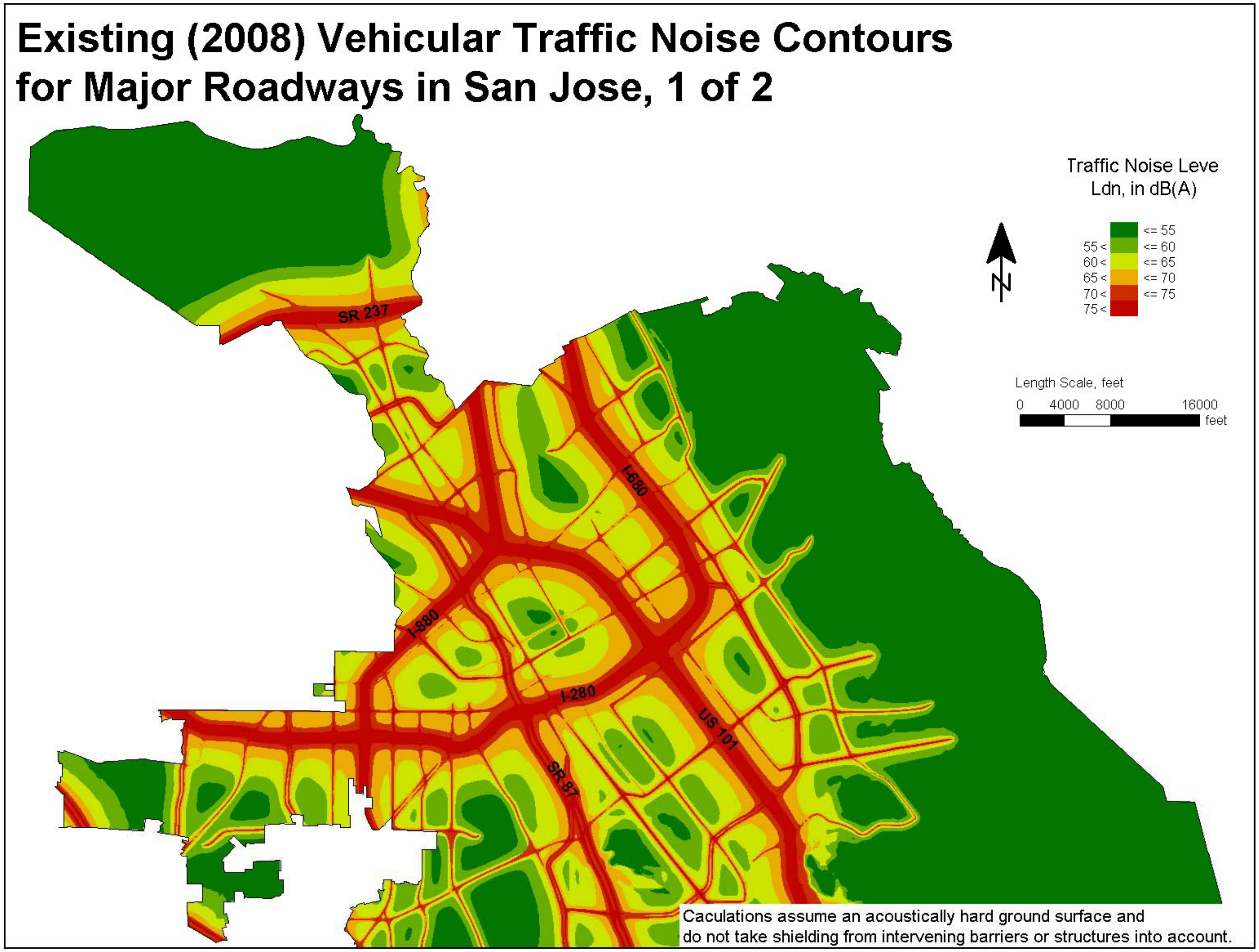

Figure 5: City of San Jose Noise Map (South)